Objectives: Readmission following vascular surgery intervention is frequent, costly, and often considered preventable. Vascular surgery outcomes have recently been scrutinized by Medicare, given high rates of readmission. We determine patient and clinical characteristics that predict readmission in a cohort of vascular surgery patients.

Methods: From 2009 to 2013, the medical records of all patients (n = 2505) undergoing interventions by the vascular surgery service at a single tertiary care institution were retrospectively reviewed. Sociodemographic and clinical characteristics were examined for association with 30-day readmission.

Results: The 30-day readmission rate to the same institution was 9.7% (n = 244). Procedures most likely to result in readmission were below-knee (25%), foot (22%), and toe amputations (19%), as well as lower extremity revisions (22%). Patients covered by Medicaid (16.8%) and Medicare (10.0%) were most likely to be readmitted followed by fee-for-service (9.5%), self-pay (8.0%), and health maintenance organization (5.5%; $P < .05$). Patients urgently admitted were more likely to be readmitted (16.2%) than electively admitted patients (9.1%; $P < .01$). Patient severity (rated using 3M APR DRG software) predicted readmission (16.2% high vs 6.2% low severity; $P < .01$). Initial length of stay was longer for readmitted than nonreadmitted patients (8.5 vs 6.1 days, respectively; $P < .01$). Intensive care unit admission during initial hospitalization was moderately associated with higher readmission rates (18.3% with vs 9.5% without intensive care unit stay; $P < .05$). Discharge destination was also a strong predictor of readmission (rehabilitation, 19.2%; skilled nursing facility, 16.2% vs home, 6.2%; $P < .01$). The effects of urgent admission, illness severity, length of stay, and discharge destination persisted in multivariable logistic regression.

Conclusions: To reduce readmission rates effectively, institutions must identify high-risk patients. Efforts should focus on subgroups undergoing selected interventions (amputations, vascular revisions), as well as urgent admissions and those with extended hospital stays. Patients in need of postacute care upon discharge are especially prone to readmission, requiring special attention to discharge planning and coordination of post-discharge care.

Combined Carotid Endarterectomy and Coronary Artery Bypass Grafting: Which Is Better, Simultaneous or Staged Approach?

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Objectives: To compare the morbidities, mortality, length of stay, and total cost between simultaneous and staged carotid endarterectomy (CEA) and coronary artery bypass grafting (CABG).

Methods: Utilizing the Nationwide Inpatient Sample (NIS), we studied all the patients that underwent CEA and CABG between 2008 and 2010. International Classification of Disease, Ninth Revision codes were used to look for procedure types, comorbidities, and complications. Data analysis was done using SPSS v.19 (IBM, Armonk, NY); statistical significance was defined as $P < .05$.

Results: Both CEA and CABG (CEA/CABG) was done in 8568 patients. CEA/CABG group was categorized into Simultaneous CEA/CABG (SmCC; same day; 4534 [52.9%]), and Staged CEA/CABG (StCC; different days, same admission; 2209 [25.8%]); 1825 (21.3%) patients were excluded (deficient coding). When SmCC was compared with StCC, Length of stay (LOS) and total charges were significantly higher in StCC; however, no significant difference was found in mortality, in-hospital myocardial infarction, or postoperative stroke. After adjustment for comorbidities (hypertension, diabetes mellitus, congestive heart failure, smoking and peripheral vascular disease), comparison of SmCC and StCC yielded comparable results for LOS and total charges, but no significant differences in mortality, in-hospital myocardial infarction, and postoperative stroke between SmCC and StCC (Table).

Conclusions: In patients with combined CEA/CABG, simultaneous surgery carries lower charges, LOS, mortality and stroke rate as compared with staged procedures in the same admission.

Effect of Plavix on Limb Salvage Following Endovascular Lower Extremity Revascularization

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Objectives: This study evaluated amputation-free-survival in patients identified utilizing Plavix (Clopidogrel) following their lower extremity endovascular revascularization (LER).

Methods: Patients 65 years of age and greater undergoing LER were identified from MedPAR files (2007 to 2008) utilizing International Classification of Disease, Ninth Revision codes. Demographics, comorbidities, and severity of disease (claudication, rest pain, ulceration/gangrene [UG]) are evaluated. Postprocedural use of Plavix was identified using the National Drug Code directory and Part D files. Outcomes were measured using χ^2 analysis, multivariable logistic regression, Kaplan-Meier, and Cox regression.

Results: A total of 14,353 patients were identified: 7189 with claudication (50.1%), 1467 with rest pain (10.2%), 5697 with UG (39.7%). Of these, 5416 (37.7%) patients were identified using Plavix after LER. Overall, patients initiated on Plavix had lower amputation rates at 30 days (10.34% vs 14.09%; $P < .0001$), 90 days (14.05% vs 18.71%; $P < .0001$), and 1 year (19.68% vs 24.06%; $P < .0001$). Multivariate logistic regression analysis adjusted by age, gender, race, and comorbidities confirmed that non-Plavix users were more likely to undergo amputation at 30 days (odds ratio [OR], 1.28; 95% confidence interval [CI], 1.14-1.43), 90 days (OR, 1.29; 95% CI, 1.16-1.43), and 1 year (OR, 1.16; 95% CI, 1.05-1.28). Males, blacks, congestive heart failure, diabetes, and renal failure were significant predictors of amputation. In χ^2, logistic regression, and Cox regression analyses, Plavix did not significantly affect amputation rates in patients with claudication or rest pain. Patients with UG who did not receive Plavix were significantly more likely to undergo amputation at 30 days (OR, 1.29; 95% CI, 1.14-1.45), 90 days (OR, 1.28; 95% CI, 1.15-1.43), and 365 days (OR, 1.19; 95% CI, 1.07-1.31).

Conclusions: Utilization of Plavix after LE endovascular revascularization was associated with lower rates of amputation, yet only 38% of the Medicare population was identified as using Plavix after intervention. Patients with UG benefited the greatest with significantly greater amputation-free survival and overall survival. Prospective randomized trials are needed to assess the suggested benefits of Plavix on amputation-free survival after LE endovascular revascularization.

Table. Adjusted and nonadjusted comparison of simultaneous and staged carotid endarterectomy (CEA) and coronary artery bypass grafting (CABG)

	Nonadjusted			*Adjusted*			
	Simultaneous	*Staged*	P	*Odds ratio*	P	*95% confidence interval*	
No.	4534	2209					
LOS, days (median)	9	13	<.01	0.182[a]	<.01	3.178	3.965
Total cost, USD (median)	124,544	171,094	<.01	0.070[a]	<.01	14641	24291
Mortality	181/4%	98/4%	.390	0.943	.671	0.720	1.236
Myocardial infarction	1099/24%	558/25%	.366	0.994	.924	0.880	1.123
Stroke	90/2%	49/2%	.528	0.878	.478	0.613	1.258

LOS, Length of stay.
[a]Standardized coefficient.

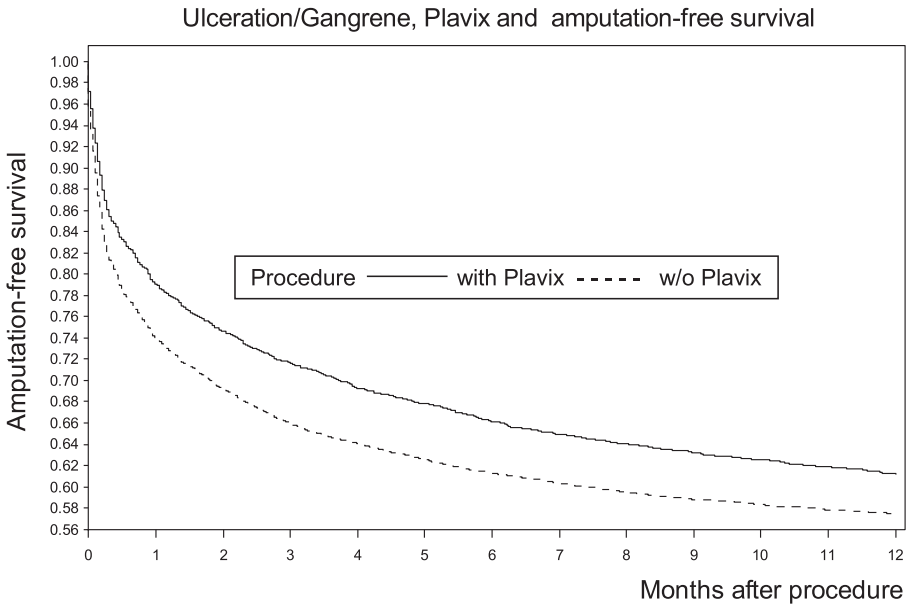

Fig.

Myofiber Type Sensitivity of Gastrocnemius Muscle to Oxidative Stress in Peripheral Arterial Disease Patients

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Objectives: Peripheral arterial disease (PAD) affects approximately 8.5 million Americans and is characterized by the formation of atherosclerotic plaques in the arteries limiting the blood supply in the legs. Previous studies have demonstrated that oxidative damage (carbonyl and 4-hydroxyl-2-nonenal adducts) in PAD muscle fibers is higher than control gastrocnemius and correlates with disease progression. In this study, we investigated the effect of oxidative damage in myofiber type (slow and fast twitch) of gastrocnemius muscle while the disease is progressing.

Methods: Muscle biopsies were collected with a Bergstrom needle from PAD-claudication patients (PAD-C; n = 28), PAD-critical limb ischemia patients (PAD-CLI; n = 25), and control subjects (n = 25). Quantitative fluorescence microscopy was used to label the myofiber sarcolemmas, carbonyl adducts, and the slow/fast/hybrid twitch fibers. Differences between and within the groups of carbonyl adducts and myofiber cross-sectional area of each myofiber type were measured. A discriminant model was used to categorize muscle specimens on the basis of the disease progression.

Results: Carbonyl adducts in gastrocnemius fibers were higher in PAD-C and PAD-CLI patients when compared with control fibers for all myofiber types. Cross-sectional area of fast twitch and hybrid fibers was significantly decreased when compared with control fibers ($P < .05$). Fast twitch and hybrid fibers demonstrated a significant increase of oxidative damage ($P < .01$) when compared with slow twitch fibers for both the PAD-C and PAD-CLI groups. Fast twitch fibers frequency was decreased while the disease was progressing, while slow and hybrid twitch fibers frequency was increased. The discriminant model demonstrated that ankle-branchial index, oxidative damage, and cross-sectional area of fast twitch fibers can accurately identify controls (100% accuracy), PAD-C (78.6% accuracy), and PAD-CLI (84% accuracy) with an overall classification accuracy of 87.2%.

Conclusions: Oxidative damage is myofiber-type-sensitive towards fast twitch and hybrid fibers. The discriminant model establishes that fast twitch fibers are more susceptible to degeneration in association with increased oxidative damage.

Liposuction-Assisted Brachio-cephalic Fistula in the Morbidly Obese: Functional Patency and Reimbursement

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Objectives: Arterio-venous fistulas (AVFs) are preferred for hemodialysis, but upper arm brachio-cephalic fistula (BCF) in the obese patient is problematic with poor functional patency. Technical reports demonstrate the feasibility of liposuction to facilitate cannulation, but no long-term functional patency data are available. There is also no published information regarding liposuction reimbursement for this indication. We report functional patency and reimbursement for BCF with staged liposuction in obese dialysis patients.

Methods: Retrospective analysis of primary and secondary functional patency in 30 consecutive obese patients (19 female, 28 diabetic; body mass index, 40.03) undergoing both BCF placement and staged liposuction at a single center. All patients underwent preoperative venous mapping and had the fistula placed under local anesthesia. All patients had a duplex ultrasound at 14 days (prior to liposuction) and at 30-days postplacement. Patients were followed weekly, and all secondary interventions were recorded. Professional and technical revenues for the liposuction procedure were also recorded.

Results: Immediate technical success was achieved in all 30 patients. Four additional patients had BCF placement but never had liposuction due to poor or occluded outflow vein on preliposuction duplex. No patient had a postoperative infection or hematoma, and all fistulas were patent by ultrasound at 1 month. Twenty-eight of 30 fistulas achieved functional patency with a mean time to initial cannulation post-liposuction of 20 days (range, 12-42 days). Primary functional patency for the 30 liposuction patients was 93.25% at 12 months (standard error <10%) with mean follow-up of 17.7 months (range, 0-42 months). Mean professional reimbursement was $1295, and technical reimbursement (to the ASC) was $1745.

Conclusions: Brachiocephalic fistula placement with staged liposuction is an effective strategy for hemodialysis access in the obese patient with respectable functional patency rates. Reimbursement is favorable for both the surgeon and the facility. Randomized studies comparing upper arm AVF with liposuction to forearm grafts are needed to determine the optimal strategy for hemodialysis access in obese patients.

Single-Center Thirty-Two-Year Experience in the Treatment of Ruptured Abdominal Aortic Aneurysms

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